

Baran Akkanat

MSc student in Artificial Intelligence

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Portfolio & project reports



Research interests: machine learning, explainable AI, cognitive modelling and human-centred AI.

EDUCATION

2025 - 2027 Expected	University of Groningen MSc Artificial Intelligence. In progress; expected completion September 2027.
2020 - 2024	Ankara University Bachelor's degree in Electrical and Electronics Engineering.

SELECTED ACADEMIC PROJECTS

June 2026 Group study	GPTSwarm: language-agent graph optimisation With Doga Turak and Madalina Gavat Reproduced graph-based agent coordination and investigated an evolutionary alternative to REINFORCE. The reported 3T3A evaluation achieved 51% versus 50% accuracy, at substantially higher token cost.
June 2026 Group project	SentenceBot: adaptive human-robot interaction Equal contribution with Efe Gorkem Sirin and Nihat Aksu Developed and demonstrated an Alpha Mini sentence game with QR topic selection, adaptive rounds and LLM response validation. Designed for children with developmental language disorder; clinical evaluation remains future work.
2026 Group study	Algorithmic fairness and explainability With Madalina Gavat and Tomash Oosterbaan Compared reweighing and threshold adjustment for income prediction, with SHAP and LIME explanations. Contributions included fairness metrics, reweighing and visualisation of performance-fairness trade-offs.

INDEPENDENT SOFTWARE DEVELOPMENT

In development	Medix - clinic workflow management Developing scheduling and patient workflows with role-aware access and audit features. TypeScript, Next.js, PostgreSQL and Prisma.
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FURTHER ACADEMIC PROJECTS

Nov 2025 Group study	Sign language recognition with MobileNetV2 With Nihat Aksu, Efe Sirin, Madalina Gavat and Doga Turak Co-authored a transfer-learning study with person-disjoint five-fold evaluation and Grad-CAM. Reported 83.3% mean accuracy and 0.812 macro-F1 for isolated static gestures.
Jan 2026 Group study	Conditioning diffusion transformers With Doga Turak and Madalina Gavat Compared adaLN and cross-attention on CIFAR-10 with synthetic captions. One-epoch experiments showed stable training but limited semantic clarity; evaluation was qualitative.
2026 Individual study	Cognitive modelling with ACT-R Modelled public-goods contribution decisions using memory retrieval and blending. Across 500 simulations per condition, reproduced qualitative ordering while underestimating inter-group effects.
2026 Individual study	Recursive theory of mind Implemented bounded recursive belief queries with simplified Dynamic Epistemic Logic. Tested first- to third-order false beliefs; higher-order repair after re-entry remained incomplete.
2025 Individual study	Dreaming agents Studied perturbed experience replay with tabular Q-learning in a 6x6 GridWorld. Limited experiments suggested a transfer/stability trade-off alongside slower initial learning. Further work and full reports are available in the portfolio.

EXPERIENCE

Upcoming Next block	WLN / Waterlaboratorium Noord Research internship planned for the next academic block, focused on requirements-driven, AI-supported knowledge access. Not yet started.
Aug - Sep 2023	KIBTEK Summer internship at Teknecik Power Plant, observing generation systems and electrical maintenance. Full internship report available online.

TECHNICAL SKILLS

Research	Python, PyTorch, scikit-learn; model evaluation, explainability and cognitive modelling.
Development	TypeScript, Next.js, PostgreSQL and Prisma.